GROUNDWATER SAMPLING PLAN
FOR
RESIDENTAL WELLS NEAR AND LOCATED WITHIN THE WILCOX SUPERFUND SITE
CREEK COUNTY, OKLAHOMA

June 23, 2014

Prepared by:

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Approved by:

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State of Oklahoma
Department of Environmental Quality
Land Protection Division

June 23, 2014
Residential Water Sampling Plan

A. General Information

Site Name: Wilcox Oil Company Superfund Site

Location: Creek County, Oklahoma, near the City of Bristow

Latitude: 35.842328
Longitude: -96.384387

North ½ of the Northwest 1/4 of Section 29, Township 16 North, Range 9 East and the Southwest 1/4 of the Southwest ¼ of Section 20, Township 16 North, Range 9 East

Objective: The Groundwater Sampling Plan is intended to establish requirements and procedures to be followed during residential well sampling. The objectives of the monitoring plan are to determine if contamination is migrating to usable portions of the local ground water, and if contingency measures are necessary to eliminate health risks associated with ground water use.

Frequency of Sampling: Future sampling will be conducted on a quarterly basis. This plan is for any future sampling events that may occur.

B. Residential Water Sampling Procedures

1) Sampling equipment to obtain prior to field entry:

tools
labels
ice chests w/ ice
paper towels
sample containers
deionized water
plastic zip-lock bags

garbage bags (39-gallon)
chain-of-custody records
logbook and waterproof marker
drinking water with container
sample log-in forms
nitrile gloves

2) Daily review Health & Safety and Ground Water Sampling Plans with sampling team members. A copy of the Superfund PA/SI QAPP will carried by the sampling team and will be followed for each sampling event.

3) Items to be recorded in the field log book:
   - weather conditions
   - well identification number (address of residential well location)
   - sample identification numbers
   - date and time sample collected
   - names of sampling team members
   - appearance of sample (i.e., color, turbidity, etc.)
   - number and description of any photographs taken
   - any changes in the Sampling Plan, Health & Safety Plan, and/or QAPP

4) Collect samples at faucets free of potentially contaminating devices such as screens, aeration devices, hoses, filtration devices, or swiveled faucets. Ensure faucet and surrounding area is clean and free of excessive dust, rain, snow, or other sources of contamination.

5) Before sampling, open faucet for 5 minutes to thoroughly flush system. Once flushed, adjust water flow so that water does not splash against surrounding surfaces such as tubs, sinks, walls, etc.

6) Water sampling will be performed immediately following well purging. Samples will be collected directly from a steady flow from the faucet. At no time is the sample container to touch any part of the faucet.

7) The successive order of sample collection will include: VOCs, SVOCs, Metals

8) Sample containers will be labeled with sample ID from which the sample was taken prior to sample collection with a waterproof marker. All sample ID's will be recorded in the field logbook for each well. Waterproof, hard plastic ice chests or coolers will be used to transport the samples to the State Environmental Laboratory (SEL). Inside the cooler, sample containers will be enclosed in clear plastic zip-lock bags and preserved with ice to 4°C.

9) The following field quality assurance/quality control (QA/QC) samples will be collected:

- Field blanks will be used to determine whether site conditions are contributing to contamination levels, especially useful where airborne contaminants are a problem. Field blanks will be collected by pouring deionized water into a vial at a rate of one blank for every ten samples or once a day.

- Trip blanks will be obtained to measure the amount of volatile contaminants, if any, absorbed through the container while in the field. Trip blanks, supplied by the State Environmental Laboratory (SEL), will be collected at a rate of one blank for every ten samples or once a day.

- Field duplicates will be obtained to assess the quality of sampling methods, sample handling, and/or laboratory procedures. They will be collected at a rate of one sample for every ten samples.

- Laboratory QA/QC blanks will be provided by the SEL at the rate of one blank for every ten samples.

10) Duplicate samples, if obtained, will be collected directly from the well spigot with each sample receiving equal amounts to ensure sample uniformity. During the sampling of such wells, partially filled sample bottles will be tightly capped, kept out of the sunlight, and if necessary cooled to 4°C. All volatile organic analysis (VOA) vials will be completely filled initially--not a portion at a time.

11) Investigation-derived wastes (IDW) will be double bagged and disposed of at the DEQ Central Office following with EPA guidance.

12) Chain-of-custody forms (Attachment 1), sample log-in forms (Attachment 2), will be completed prior to delivery to the SEL. Samples will be hand delivered directly to the SEL.

C. Sample Analysis

Samples collected will be analyzed for volatile organic compounds (VOCs), semivolitile organic compounds (SVOCs), and metals as presented in Table 1-Analyte List. The sample analysis to be performed, the number of containers, the sample preservation, and the analytical methods are presented in tabular form in Table 2-Sample Analysis Summary. The State Environmental Laboratory (SEL) will be utilized for the analysis of all samples collected by the sampling team.

Table 1: Analyte List

VOCs	SVOCs	METALS
1,1,1-Trichloroethane	Acenaphthylene	Arsenic
1,1,2- Trichloroethane	Acenaphene	Barium
1,1-Dichlorethene	Anthracene	Beryllium
1,2,4-Trichlorobenzene	Benzo(b)fluoranthene	Cadmium
1,2-Dichlorobenzene	Benzo(a)Pyrene	Chromium
1,2-Dichloroethane	Bis (2-chloroethyle) ether	Copper
1,2-Dichloropropane	Bis (2-chloroethoxy) methane	Lead
1,4-Dichlorobenzene	Bis (2-chloroisopropyl) ether	Thallium
Benzene	Butylbenzylphthalate	Nickel
Carbon Tetrachloride	Chrysene	Silver
Chlorobenzene	Diethylpthalate	Zinc
CIS-1,2-Dischloroethene	Dimethylphthalate	Antimony
Ethylbenzene	Fluoranthene	Selenium
Methyl tert-Butyl Ether (MtBE)	Fluorene	Mercury
Methylene Chloride	Hexachlorocyclopentadiene	
Sytrene	Hexachloroethane in water	
Tetrachloroethene	Indeno (123cd) pyrene	
Toluene	Isophorone	
Trans-1,2-Dichlorethene	Nitrosodipropylamine	
Trichloroethene	Nitrosodiphenyamine	
Vinyl Chloride	Nitrorbenzene	
Xylenes	p-Chloro-m-cresol	
	Phenanthrene	
	Pyrene	
	Benzo (ghi) perylene	
	Benzo (a) anthracene	
	Dibenzo (ah) anthracene	
	2-Chloronapthalene	
	2-Chlorophenol	

	SVOCs (cont.)	
	2-Nitrophenol	
	Di-n-octylphthalate	
	2,4-Dichlorophenol	
	2,4-Dimethylphenol	
	2,4-Dinitrotoluene	
	2,4-Diditrophenol	
	2,4,6-Trichlorophenol	
	2,6-Dinitrotoluene	
	3,3'-Dichlorobenzidine	
	4-Bromophenylphenyl ether	
	4-Chlorophenyl phenylether	
	4-Nitrophenol	
	4,6- Dinitro-o-cresol	
	Phenol	
	Naphthalene	
	Pentachlorophenol	
	Bis (2-ethylhexyl) phthalate	
	Di-n-butylphthalate	
	Hexachlorobenzene	
	Hexachlorobutadine	
	Dibenzofuran	
	2-Methylnapthalene	
	2-Methylphenol	
	2,4,5-Trichlorophenol	
	4-Chloroaniline	
	2- Nitroaniline	
	3-Nitroaniline	
	4-Nitroaniline	
	1,4-Dichlorobenzene	
	1,2,4-Trichlorobenzene	

Table 2 Sample Analysis Summary

Laboratory Parameter	Sample Container	Analytical Method	Preservative
VOCs	3, 40ml volatile organic analysis/VOA vials with teflon-lined septum. Fill completely, no air.	Method 524.3	Ice to 4°C
Metals	1-Quart high density polyethylene bottle. Fill to shoulder.	Method 200.8	Ice to 4°C
SVOCs	3-Quart glass jars. Fill to shoulder.	Method 8270	Ice to 4°C

* American Public Health Association, American Water Works Association, and Water Pollution Control Federation, "Standard Methods for the Examination of Water and Wastewater," 1992 (18th Edition).

D. Sample Handling

A sample is considered to be in an individual's custody if any of the following conditions are met:

1) The sample is in an individual's possession or is in view after being in possession;

2) It was in possession and then locked up or sealed to prevent tampering; or

3) It is in a secured area.

The team member performing the sampling is responsible for the care and custody of the collected samples until the samples are dispatched properly. The sampling team leader or project manager will review all field activities to assure and/or confirm that proper custody procedures are/were followed during fieldwork.

The Chain-of-Custody Record will be employed as physical evidence of sample custody. The sampler will complete a Chain-of-Custody Record to accompany each cooler shipped from the field to the laboratory. Attachment 1 is an example of a Chain-of-Custody Record. The custody record will be completed using waterproof black ink. Any corrections will be made by drawing a line through the entire line and initializing the error, then entering the correct information on the next line. Erasures will not be permissible.

The laboratory representative who accepts the incoming sample shipment will sign and date the Chain-of-Custody Record to acknowledge receipt of the samples. Once the sample transfer process is complete, the laboratory will be responsible for maintaining internal logbooks and records that provide a custody record throughout sample preparation and analysis.

E. Residential Sampling Plan

Ground water sampling activities will consist of sampling of private wells in order to monitor ground water in the vicinity of private residents. Wells will be sampled quarterly, beginning in June 2014. No end date has been established. The samples will be analyzed for VOCs, SVOCs, and Metals. A total of eight wells will be utilized in the monitoring program. All wells are 100 to 120 feet deep (see Attachment 3).

F. Quality Assurance/Quality Control (QA/QC)

To support data integrity, DEQ staff will take quality assurance (QA) and quality control (QC) measures during the sampling events. Specific details are provided in the Site Assessment Unit Quality Assurance Project Plan (QAPP) FFY14.

G. Project Personnel

Todd Downham	Environmental Programs Specialist	Project Manager Sampling Team Leader
Brian Stanila	Environmental Programs Specialist	Health and Safety Officer Sampling Team

During site activities, the DEQ sampling team may require additional personnel to assist in site activities. These additional staff members will be briefed on the sampling objectives and site conditions. The final SI report will document any additional staff members used during the sampling event.

ATTACHMENT 1
CHAIN-OF-CUSTODY FORM

CHAIN OF CUSTODY RECORD

SUPERFUND/ SITE REMEDIATION UNIT
OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

Site Name: WILCOX	Site Location: CREEK CO.	Code:292119514	Return Results To: TODD DOWNHAM (LPD)

SAMPLE I.D.	Date	Time	Number of Containers	VOC (524.3)	SVOC (8270)	Metals (200.8)					SEL Numbers
WR-1				X	X	X					
WR-2				X	X	X					
WR-3				X	X	X					
WR-4				X	X	X					
WR-5				X	X	X					
WR-6				X	X	X					
WR-7				X	X	X					
WR-8				X	X	X					
WR-9				X	X	X					
TRIP BLANK	-		1	X							
FIELD BLANK			1	X							

Sampler's Signature (Relinquished by):	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time

ATTACHMENT 2
SAMPLE LOG-IN FORM

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE ENVIRONMENTAL LABORATORY
LAND PROTECTION DIVISION
SAMPLE LOG-IN FORM

FOR LAB USE ONLY

Sample No.: _____

Project Code:

This box must be completed in full or samples may be rejected

Collectors Name: TODD DOWNHAM HW _____ or SW _____ or SF _____

Facility Name: WILCOX SUPERFUND SITE

Check Type of Sample: LIQUID _____ or Sediment _____ or Drinking Water X

Chlorinated? Yes _____ No _____

Date Collected: _____ / _____ / _____ Time Collected: _____ : _____

City: _____ County: CREEK CO. Program Code: 292119514

Sample Identification or Samplers Comments: _____

GC/MS

*Purgeables (Vol's 8260) _____

*Extractables (S-Vol's 8270) X

VOCs (Drinking Water 524.3) X

If there are two phases in one bottle; pick one.
If you want both phases; we need two sets of sample to analyze each phase.

Aqueous Phase _____

Organic Phase _____

METALS LAB

Priority Pollutants _____
(6010)
Arsenic _____
Barium _____
Beryllium _____
Cadmium _____
Chromium _____
Copper _____
Lead _____
Thallium _____
Nickel _____
Silver _____
Zinc _____
Antimony _____
Selenium _____
Mercury _____

TCLP Metals _____
XRF

Drinking Water X
**(PDES 200.7 or DW 200.8)
Silver _____ Conductivity _____
Sodium _____ Turbidity _____
Arsenic _____
Barium _____
Beryllium _____
Cadmium _____
Chromium _____
Copper _____
Iron _____
Lead _____
Manganese _____
Thallium _____
Nickel _____
Zinc _____
Antimony _____
Selenium _____
Mercury

General Chemistry Lab

Organics Lab

Pesticides _____
Herbicides _____
PCBs _____
TPH _____
GRO _____
Flashpoint

Other

CONTACT THE PROJECT MANAGER, Todd Downham , Ext. 5136 ,
IF THE DILUTION FACTOR IS ABOVE 5.00 FOR PURGEABLES AND ABOVE 2.00 FOR EXTRACTABLES.

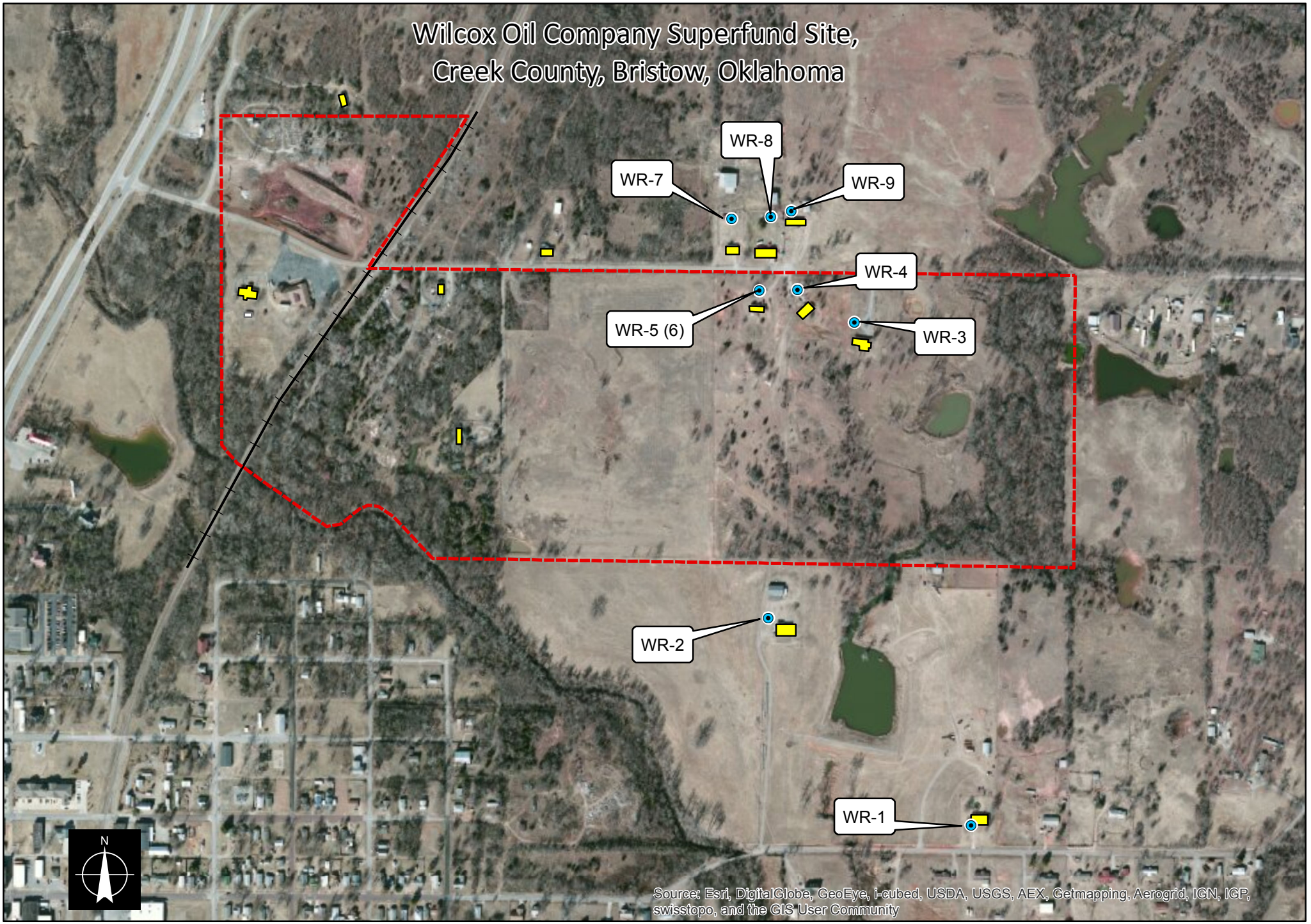
****METHOD SELECTION IS DETERMINED BY CONDUCTIVITY AND TURBIDITY**

Return to: Todd Downham
Land Protection Division

Copy to: _____

File _____

ATTACHMENT 3
WELL LOCATION MAP



Site Boundary
Private Well Locations
Residence

0 0.125 0.25 0.5 Miles

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
...for a clean, attractive, prosperous Oklahoma